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<p>(54) Title: <b>BRIEF WITH IMPROVED DUAL FASTENING SYSTEM</b></p> <p>(57) Abstract</p> <p>The invention is an absorbent article having a first end, a first waistband section contiguous with the first end, a second end, a second waistband section contiguous with the second end, an intermediate section which interconnects the first and second waistband sections, and longitudinal sides extending between the first and second ends. The absorbent article comprises: a backsheet layer; a liquid permeable topsheet layer superposed in facing relation with the backsheet layer; an absorbent assembly interposed between the backsheet and topsheet layers; and, a fastening system for providing a side closure for the absorbent article. The fastening system, disposed on the absorbent article, comprises two independent securing members disposed adjacent each of the longitudinal edges in the first waistband section and having a separation distance of less than 2.5 inches.</p>			

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## BRIEF WITH IMPROVED DUAL FASTENING SYSTEM

### FIELD OF THE INVENTION

This invention relates to fastening systems for disposable incontinence garments, and more particularly, to a dual fastening system for such disposable garments that provide better fit and improved leakage results.

### BACKGROUND OF THE INVENTION

Disposable garments are generally well known in the art and have become an important and an essentially indispensable sanitary protection item, most particularly in the field of infant, child, and adult care where disposable garments, such as diapers or other similar garments for incontinent persons, provide for the absorption and containment of urine and other body exudates. Present commercially available disposable garments are generally unitary, pre-shaped and pre-folded, and comprised of a porous (liquid permeable) facing layer, a liquid impervious backsheet layer with an absorbent material disposed therebetween. These presently available disposable garments have met a particular need and have become ever increasingly popular.

However, even though the presently available disposable incontinence garments are efficient and effective, the garments have several drawbacks that have been identified by both individuals wearing the garments, referred to as users in this application, and caregivers who assist in placing the garments on other individuals. The users and caregivers have strongly voiced their desire to be able to obtain disposable incontinence garments that are aesthetically neat and attractive when in use. The aesthetically neat criteria have been identified as including a trim, slim fit, and a neat fitting waist, sides, and legs that do not allow leakage of urine or feces. It has also been found undesirable for the garments to look rumpled, bulky, or messy when the garment is in use. The garments would also preferably appear more pant-like or underwear-like, thereby providing feelings of normalcy and dignity for the users. In addition, users and caregivers have expressed a desire to either have a disposable garment that fits more sizes of individuals or to have disposable garments provided in a wider range of sizes.

Another drawback identified by users and caregivers has been the problem associated with skin irritation caused by urine, feces, or moisture trapped next to the skin. They have again been very vocal in their desire to obtain disposable garments that avoid or solve this problem.

Another major drawback is associated with the methods provided to secure the garment around the user. The method most utilized in present commercially available disposable garments is the plastic sealable tape. Initially, the fastening tapes introduced on disposable diapers were not resealable, which meant that when an individual wished to check the garment for wetness or to adjust the fit, the tapes could not be resealed. This, in turn, meant that the garment, if not ready to be changed, would have to be thrown away. Presently, disposable garments use tapes that are manufactured to be resealable. The users and caregivers have indicated that they want disposable garments that have fasteners that are always resealable and that are not easily unfastened by contact with clothing, or during usual movement or wear. It has been found that some of the fasteners currently being used on commercial products are subject to contamination by powders, oils, and other substances which prevent the fasteners from resealing, or in the worst case, prevent the fasteners from sealing upon initial use. The attempt to provide fastening tapes that are always resealable has caused some manufacturers to utilize stronger adhesives on the fastening tapes. Unfortunately, however, the stronger adhesives have a tendency to tear the outer cover, also referred to as the backsheet layer, of the garment which may also cause the garment to be unusable.

Furthermore, the fastening tapes used on present disposable garments can also have a detrimental effect upon the fit of the garment. Because the fastening tapes are typically made to be sealable on any portion of the outer cover or backsheet layer of the garment, and there is no indication to users and caregivers where the fastening tapes should be sealed, the fastening tapes are very often sealed to the outer cover of the garment at the wrong position which has several detrimental effects. First, the garment does not fit on the user properly, for example, if too loose, the garment falls down or droops at the waist, or if too tight, causes strain in the outer cover of the garment which can make the user uncomfortable. Second, the improper positioning of the fastening tapes can cause the leg openings to gap thus causing leakage. Third, the improper positioning of the fastening tapes can cause the sides of the garment to gap thus causing leakage.

Still, other means for securing the garment around the individual includes mechanical type fasteners. These include buttons, button holes, snaps, buckles, clasps, hooks and loops, end extensions, tabs, and the like which are designed or adapted to interlock or engage some type of a complimentary device or the outer cover of the garment. In addition, elasticized fasteners are also used in assuring better fit of such

garments. However, some of these fasteners can be difficult to attach and some are not very discrete under clothing.

In addition, the use of a fastening system wherein three pairs of fasteners, also referred to as securement members, secure the garment around the user can be cumbersome for both users and caregivers. However, dual fastening systems, systems using two pairs of fasteners, can have a detrimental effect upon the fit of the garment. The sides of the garments using such a dual fastening system develop gaps between the two fasteners on each side, resulting in a rumpled appearance that may not be hidden under clothing as well as increased potential for leakage.

The attempts to solve the drawbacks associated with present disposable garments have extended over several years and include several different methods. One method to improve fit involves geometrical folding of the rectangular diapers for the purpose of narrowing the apparent width in the crotch area. One example of this method includes a rectangular garment, a diaper, provided with parallel longitudinal folded box pleats and a loose overlying flap along each side. Another method discloses a rectangular garment, a diaper, including triangular-shaped infolds in the crotch area.

These two methods permit the garment to be more easily fitted to the user, however, problem areas remain. First, the pre-folded rectangular garment results in increased bulk between the legs causing discomfort to the user. Second, the non-conforming bulk prevents the garment from closely conforming to the legs leaving gaps which permit leaks to occur. Third, the non-conforming sides tend to pull the waist down at the sides thereby causing the garment to gap at the front of the waist where leaks can also occur. Third, the gapping at the front waist contributes to making the garment appear bulky, sloppy, and messy.

To solve the resulting problems associated with the non-conforming bulk between the legs, different methods, including reducing the width of the absorbent pad in the crotch area, were tried. However, because the materials used in constructing disposable garments are relatively non-conformable, a close fit around the thighs is difficult to achieve and undesirable gaps still have a tendency to occur. In addition, the reduced width of the absorbent pad reduces the available absorbent capacity which also further increases the potential for leakage. In an attempt to reduce leakage, one method discloses a garment, a diaper wherein the edges of the garment include elasticized, flexible flaps between the elasticized line and the edge of the absorbent pad in the crotch.

Again, an attempt to solve one problem results in the emergence of another problem. Elasticized flaps provide a tight seal to the thighs because the tensioned elastic presses the easily deformable flaps into close contact with the legs. However, the tight seal at the thighs can have several causal effects. First, the tight seal can cause urine to collect near the edges of the garment which can permeate into the area between the flap and the skin where it can cause skin irritation. Second, because it is necessary to reduce the absorbent pad width in order to provide the required flap width, the remaining absorbent becomes excessively wet and leaks can still occur. Third, when the reduced width of the absorbent becomes excessively wet, it tends to separate and bunch up at the bottom of the crotch of the garment thus hindering fluid transfer to unused portions of the absorbent pad.

To solve the problems associated with elasticized flaps a new and improved disposable garment has been disclosed in which the garment, a diaper, is elasticized only along the edges in a narrowed crotch area in a manner to give a more conformable leg fit as well as improved functional absorbent capacity. This is achieved by attaching the elastic immediately adjacent to the edges of the absorbent pad and also bonding the absorbent pad to contract when the elastic contracts thus producing gross transverse rugosities, *inter alia*, in the crotch area. These gross transverse rugosities increase the effective absorbent capacity of the absorbent pad by decreasing the tendency of the absorbent to separate and increasing the wicking characteristics of the absorbent.

#### SUMMARY OF THE INVENTION

In response to the failure of the art to recognize the above-referenced problems or suggest a completely satisfactory solution thereto, a new absorbent article has been developed. The absorbent article includes a garment with a dual fastening system wherein the fastening system securement members on each side of the garment are separated by a distance of less than about 2.5 inches (about 6.3 cm). The garment is preferably a disposable incontinence garment.

In one aspect, the invention relates to an absorbent article, such as a disposable incontinence garment, including a dual fastening system. The absorbent article has a first end, a first waistband section contiguous with the first end, a second end, a second waistband section contiguous with the second end, an intermediate section which interconnects waistband sections, and longitudinal sides extending between the first and second ends. The absorbent article comprises a backsheet layer; a liquid permeable topsheet layer superposed in facing relation with the backsheet layer; an absorbent

assembly interposed between the backsheet and topsheet layers; and, a dual fastening system. The dual fastening system provides side closures for the absorbent article.

The dual fastening system includes two independent securement members placed adjacent each of the longitudinal edges in the first waist section. The securement members on each side of the article are separated by a distance of less than about 2.5 inches (about 6.3 cm). At least one of the securement members is adapted to engage the backsheet layer of the second waistband section. At least one of the securement members includes a tab member having a fixed portion joined to the backsheet layer, a tab portion extending outwardly from the adjacent longitudinal edge and joined to the fixed portion, and a first fastening component placed on the tab portion. The securement members are distinct members which do not depend on or from other securement members and do not have a common fixed portion, tab member, tab portion, or first fastening component. Each securement member functions independently from the other securement members. In one embodiment, at least one of the first fastening components include an adhesive attachment layer for adhesively securing the tab portion to the outer surface of the backsheet layer. In an alternative embodiment, the first fastening components may include a first mechanical closure element that is adapted to engage the outer surface of the backsheet layer.

In another aspect, the invention relates to an absorbent article, such as a disposable incontinence garment, including a dual fastening system. The absorbent article has a first end, a first waistband section contiguous with the first end, a second end, a second waistband section contiguous with the second end, an intermediate section which interconnects the waistband sections, and longitudinal sides extending between the first and second ends. The absorbent article comprises a backsheet layer; a liquid permeable topsheet layer superposed in facing relation with the backsheet layer; an absorbent assembly interposed between the backsheet layer and the topsheet layers; and, the dual fastening system. The dual fastening system provides a side closure for the absorbent article by maintaining the first waistband section and the second waistband section in an overlapping configuration such that lateral tension is maintained around the absorbent article for securing the absorbent article on a user.

The dual fastening system includes two independent securement members placed adjacent each of the longitudinal edges in the first waist section. The securement members on each side of the article are separated by a distance of less than about 2.5 inches (about 6.3 cm). The dual fastening system also includes at least one landing

member located in the second waist region. The landing member serves as a target attachment zone for the securement members.

The securement members each include a tab member having a fixed portion joined to the backsheet layer, a tab portion extending outwardly from the longitudinal edge and joined to the fixed portion, and a first fastening component located on the tab portion. At least one of the first fastening components include an adhesive attachment layer for adhesively securing the tab portion to the landing member or a first mechanical closure element that attaches to a second fastening component located on the landing member. In the later case, the second fastening component has a second mechanical closure element that mechanically engages the first mechanical closure element.

While major differences in anatomy and body proportions exist between adults and children (including infants) which typically render simply scaled down versions of adult disposable garments for child wear impossible, the present invention, a dual fastening system, can be applied to child and infant disposable garments, such as diapers.

Numerous features and advantages of the present invention will appear from the following description. In the description, reference is made to the accompanying drawings which illustrate preferred embodiments of the invention. Such embodiments do not represent the full scope of the invention. Reference should therefore be made to the claims herein for interpreting the full scope of the invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the absorbent article of the present invention, in flat fully extended form, as viewed from the body side, with certain portions broken away to better illustrate the various layers and component elements of the article.

FIG. 2 is a top plan view similar to FIG. 1 but with reduced ears showing placement of the securement members on the reduced ears.

FIG. 3 is a frontal view of the absorbent article of the present invention as worn by a user.

FIG. 4 is a perspective view of the securement member adjacent a longitudinal side, shown bonded to a portion of the ear of a waistband section of the article.

FIG. 5 is a perspective view similar to FIG. 4, shown with a reduced ear.

### DEFINITIONS

Within the context of this specification, each term or phrase below will include the following meaning or meanings:

- (a) "bonded" refers to the joining, adhering, connecting, attaching, or the like, of two elements. Two elements will be considered to be bonded together when they are bonded directly to one another or indirectly to one another, such as when each is directly bonded to intermediate elements.
- (b) "disposable" includes being disposed of after use, and not intended to be washed and reused.
- (c) "disposed," "disposed on," "disposed with," "disposed at," "disposed near," and variations thereof are intended to mean that one element can be integral with another element, or that one element can be a separate structure bonded to or placed with or placed near another element.
- (d) "elastic," "elasticized," and "elasticity" mean that property of a material by virtue of which it tends to recover its original size and shape after removal of a force causing a deformation.
- (e) "layer" when used in the singular can have the dual meaning of a single element or a plurality of elements.
- (f) "liquid impermeable" when used to describe a layer or laminate means that urine will not pass through the layer or laminate under ordinary use conditions in a direction generally perpendicular to the plane of the layer or laminate at the point of liquid contact.
- (g) "member" when used in the singular can have the dual meaning of a single element or a plurality of elements.
- (h) "permeable" and "permeability" refer to the ability of a fluid, such as, for example, a gas to pass through a particular porous material. Permeability may be expressed in units of volume per unit time per unit area, for example, cubic feet per minute/per square foot of material (e.g., ft<sup>3</sup>/minute/ft<sup>2</sup>).
- (i) "releasably attached," "releasably bonded," "releasably engaged," and variations thereof refer to two elements being connected or connectable such that the elements tend to remain connected absent a separation force applied to one or both of the elements, and the elements being capable of separation without substantial permanent deformation or rupture. The required separation force is typically beyond that encountered while wearing the absorbent garment.

- (j) "operatively joined," "elastically associated," and "associated with" with reference to the attachment of an elastic member to another element means that the elastic member when attached to or placed with or formed from the element gives that element elastic properties. With reference to the attachment of a non-elastic member to another element, it means that the member and element can be attached or placed together in any suitable manner that allows or permits them to perform their intended or described function, while not completely inhibiting the properties of the individual elements. The attaching or placing can be either directly, such as attaching or placing either member directly with an element, or can be indirectly by means of another member or element disposed between the first member and the first element.
- (k) "outward" and "inward" refer to the positions relative to the center of an absorbent garment, and particularly transversely and/or longitudinally closer to or away from the longitudinal and transverse center of the absorbent garment.

These terms may be defined with additional language in the remaining portion of the specification.

#### DETAILED DESCRIPTION OF THE INVENTION

With reference to Figs. 1 - 3, an absorbent article 20 according to the present invention, such as a disposable incontinence garment 22, is secured about the body of a user 24 with a dual fastening system 26. The garment 22 is shown for purposes of illustration as an adult disposable incontinence product. Other types of garments, for example diapers, health care garments, or the like, can also be used. The garment 22 has opposite major surfaces designated inner surface 30 and outer surface 32 (Fig. 1). The garment 22 includes a first end 34, an opposite second end 36, and longitudinal sides 38 extending between the first and second ends 34 and 36.

The inner surface 30 of the garment 22 comprises that portion of the garment 22 which is intended to be positioned adjacent to the user's body 24 during use. The inner surface 30 typically includes at least a portion of the topsheet layer 80 and other components attached to the topsheet layer 80. The outer surface 32 of the garment 22 comprises that portion of the garment 22 which is positioned away from the user's body

24 during use. The outer surface 32 typically includes at least a portion of the backsheet layer 78 and other components attached to the backsheet layer 78.

The garment 22 defines a first waistband section 40 contiguous with the first end 34 and extending inwardly therefrom, and an opposite second waistband section 42 contiguous with the second end 36 and extending inwardly therefrom. An intermediate section 44 is located between and interconnects the first and second waistband sections 40 and 42. When the garment 22 is placed about a user 24 as illustrated in Fig. 3, the intermediate section 44 is generally the portion of the garment 22 located in the crotch region of the user 24.

The first and second waistband sections 40 and 42 each comprise a central region 46 and a pair of ears which typically comprise the outer lateral portions of the first and second waistband sections 40 and 42. The ears of the first waistband section 40 are designated as 48 and the ears of the second waistband section 42 are designated as 50. The ears 48 and 50 may be operatively joined or associated with an elastic member 72.

The dual fastening system 26 comprises two independent securement members 28 disposed adjacent to each of the longitudinal sides 38 in the first waistband section 40 and having a separation distance 68 of preferably less than about 2.5 inches (about 6.3 cm), more preferably less than about 2.0 inches (about 5.0 cm), and most preferably less than about 1.75 inches (about 4.4 cm). Each securement member 28 is adapted to engage the outer surface 32 of the backsheet layer 78 on the second waistband section 42 of the garment 22 thereby providing a side closure for the garment 22. Preferably, the securement members 28 are adapted to repeatedly, releasably engage the outer surface 32. In some embodiments, the side closure of the garment 22 is accomplished by maintaining the first waistband section 40 and the second waistband section 42 in an overlapping configuration such that lateral tension is established and maintained around the garment 22, thereby securing the garment 22 on the user 24.

Each securement member 28 comprises a tab member 52, a tab portion 54, and a first fastening component 56. Examples of fastening systems and securement members are disclosed in U.S. Pat. Nos. 5,423,789 to Kuen; 5,405,342 to Roessler et al.; 5,403,302 to Roessler et al.; 5,399,219 to Roessler et al.; 5,386,595 to Kuen et al.; 5,374,262 to Keuhn, Jr. et al.; 5,318,555 to Siebers et al.; 5,304,162 to Kuen; 5,288,546 to Roessler et al.; 5,176,671 to Roessler et al.; 5,176,671 to Roessler et al.; and, 5,019,073 to Roessler et al., all of which are incorporated herein by reference.

The securement member 28 comprises a tab member 52 having a fixed portion 58 joined to the outer surface 32 of the backsheet layer 78 of the first waistband section 40 and a tab portion 54 extending laterally outwardly from the longitudinal side 38 of the first waistband section 40 and joined to the fixed portion 58 and a first fastening component 56. In some embodiments, at least one of the first fastening components 56 comprises an adhesive attachment layer 74 that is adapted to engage, thereby adhesively securing, the tab portion 54 to the outer surface 32 of the backsheet layer 78 on the second waistband section 42. Preferably, at least one of the first fastening components 56 is adapted to refastenably attach or engage with the outer surface 32, meaning that the outer surface 32, the first fastening component 56, or both are adapted to repeatedly, releasably engage one another. The tab portion 54 of the securement member 28 may further comprise an elastic member 72 disposed between the fixed portion 58 and the first fastening component 56. The elastic member 72 can be made of material which includes elastic strands or ribbons or other stretchable fabrics.

In other embodiments, at least one first fastening component 56 comprises a first mechanical closure element 60 adapted to mechanically engage with the outer surface 32 of the backsheet layer 78 on the second waistband section 42. (See Fig. 2) The first mechanical closure elements 60 (also referred to as interlocking closure elements) typically comprise of a plurality of engaging elements that project from the tab portion 54. The engaging elements of at least one of the first mechanical closure elements 60 are adapted to repeatedly and releasably engage and disengage the outer surface 32 of the backsheet layer 78 on the second waistband section 42 of the garment 22. Suitable engaging elements for such mechanical closure elements include self-engaging geometric shaped materials, such as hooks, loops, snaps, buckles, bulbs, mushrooms, arrowheads, balls on stems, male and female mating components, or the like. The tab portion 54 of the tab member 52 may further comprise an elastic member 72 disposed between the fixed portion 58 and the first fastening component 56.

A representative securement member 28 is shown in Figs. 1, 2, 4, and 5. There are two opposing pairs of securement members 28 attached to the first waistband section 40 as illustrated in Figs. 1 and 2. In alternative embodiments, the location of the securement members 28 can be varied, in that a pair of securement members 28 can be positioned adjacent a longitudinal side 38 on the first waistband section 40 near the first end 34, alternatively, near the intermediate section 44 or any position in between the first end 34 and the intermediate section 44 adjacent the longitudinal side 38. In other

embodiments, the securement members 28 are disposed on the second waistband section 42 in the various positions described in relation to the first waistband section 40 as discussed in the embodiments above.

In other embodiments, the dual fastening system 26 comprises two independent securement members 28 disposed adjacent to each of the longitudinal sides 38 in the first waistband section 40 and having a separation distance 68 of preferably less than about 2.5 inches (about 6.3 cm), more preferably less than 2.0 inches (about 5.0 cm), and most preferably less than about 1.75 inches (about 4.4 cm), and at least one landing member 62. At least one landing member 62 is disposed on the outer surface 32 of the backsheet layer 78 of the second waistband section 42 and is adapted to engage the securement members 28. At least one of the securement members 28 is adapted to engage the outer surface 32 of the garment 22 or at least one landing member 62 thereby providing a side closure for the garment 22. Preferably, the securement members 28, at least one landing member 62, or both are adapted to repeatedly, releasably engage the outer surface 32 or each other. In some embodiments, the side closure of the garment 22 is accomplished by maintaining the first waistband section 40 and the second waistband section 42 in an overlapping configuration such that lateral tension is established and maintained around the garment 22, thereby securing the garment 22 on the user 24.

Each securement member 28 comprises a tab member 52, a tab portion 54, and a first fastening component 56. The securement member 28 comprises a tab member 52 having a fixed portion 58 joined to the outer surface 32 of the backsheet layer 78 of the first waistband section 40 and a tab portion 54 extending laterally outwardly from the longitudinal side 38 of the first waistband section 40 and joined to the fixed portion 58 and to the first fastening component 56. In some embodiments, at least one of the first fastening component 56 comprises an adhesive attachment layer (not shown) that is adapted to engage, adhesively securing, the tab portion 54 to the landing member 62 on the outer surface 32 of the backsheet layer 78 on the second waistband section 42. Preferably, at least one of the first fastening components 56 is adapted to refastenably attach or engage with the landing member 62, meaning that the landing member 62, the first fastening component 56, or both are adapted to repeatedly, releasably engage one another. The tab portion 54 may further comprise an elastic member 72 disposed between the fixed portion 58 and the first fastening component 56.

In some embodiments, at least one first fastening component 56 comprises a first mechanical closure element 60 adapted to mechanically engage with the outer surface 32 of the backsheet layer 78 of the second waistband section 42 or with the landing member 62 on the second waistband section 42. Other embodiments include at least one landing member 62 having a second fastening component 64 comprising a second mechanical closure element 66 adapted to mechanically engage with the first mechanical closure element 60. The first and second mechanical closure elements 60 and 66, also commonly referred to as interlocking components or closure elements, typically comprise of a plurality of engaging elements (not shown) that project from the tab portion 54. The engaging elements of at least one first mechanical closure elements 60 are adapted to repeatedly engage and disengage at least one second mechanical closure element 66 of the landing member 62 disposed on the outer surface 32 of the backsheet layer 78 of the garment 22. Suitable engaging elements for the first and second mechanical closure elements 60 and 66 include self-engaging geometric shaped materials, such as hooks, loops, snaps, buckles, bulbs, mushrooms, arrowheads, balls on stems, male and female mating components, or the like.

In some instances, the first mechanical closure element 60 comprises a hook fastening material (Fig. 2) and the second mechanical closure element 66 comprises a loop fastening material (not shown). In other instances, the first mechanical closure element 60 comprises a loop fastening material and the second mechanical closure element 66 comprises a hook fastening material (Fig. 2). The term loop fastening material is intended to mean any fabric having a base or backing structure and a plurality of loop members extending upwardly from at least one surface of the backing material. The term hook fastening material is intended to mean any fabric having a base or backing structure and a plurality of hook members extending upwardly from at least one surface of the backing material.

The engagement of the engaging elements, as discussed above, is accomplished mechanically rather than adhesively, and the engaging elements are adapted to resist disengagement in a shear mode yet release relatively easy from one another in a peel mode. The shear mode of a fastener system release refers to forces tending to separate the first and second mechanical closure elements 60 and 66 (such as hook and loop material) when the elements are subjected to opposing forces in the plane of attachment of the elements, and the peel mode of a fastener release refers to forces tending to separate the mechanical closure elements when one element is subjected to a force perpendicular to the plane of attachment of the elements. As used herein, the term force

includes a physical influence exerted by one body on another which produces acceleration of bodies that are free to move and deformation of bodies that are not free to move.

A representative securement member 28 is shown in Figs. 1, 2, 4, and 5. There are two opposing pairs of securement members 28 attached to the first waistband section 40 as illustrated in Figs. 1 and 2. In alternative embodiments, the location of the securement members 28 can vary, such as at either or both of the longitudinal sides 38 of either or both of the first or second waistband sections 40 and 42, as long as the separation distance 68 of less than about 2.5 inches (about 6.3 cm) between the securement members 28 positioned adjacent each longitudinal side 38 of the first waistband section 40 or the second waistband section 42 is maintained. The separation distance 68 is the distance between the fixed portions 54 of the securement members 28 adjacent to each longitudinal sides 38, parallel to the longitudinal axis 70 of the garment 22. The measurement is taken when the garment is in a flat fully extended configuration. The preferred separation distance 68 is less than about 2.5 inches (about 6.3 cm). In other embodiments, it is preferable to use separation distances 68 of less than about 2.0 inches (about 5.0 cm) and less than about 1.75 inches (about 4.4 cm).

Decreasing the separation distance 68 between the securement members 28 adjacent to the longitudinal sides 38 on each of the ears 48 on the second waistband without decreasing the size of the ears 48 and 50 may result in another fit problem. Garments using a three pair fastening system may have some problems with the fabric (materials) at both sides in the first and second waistband sections 40 and 42 adjacent to the longitudinal edges 38 both above the top securement member 28 and below the bottom securement member 28 folding back onto the user 24 such that the outer surface 32 of the backsheet layer 78 comes into contact with the user's skin. Such contact may cause skin irritation.

The dual fastening system 26 of the present invention, due to the smaller separation distance 68, results in additional fabric at both sides of the first and second waistband sections 40 and 42 adjacent to the longitudinal edges 38 both above the top securement member 28 and below the bottom securement member 28. The user 24 and the care provider needs to exercise more care in preventing the folding back of fabric so that the outer surface 32 of the backsheet layer 78 does not come into contact with the user's skin. However, reducing the size of the ears 48 and 50 in the first and second waistband sections 40 and 42, this problem is avoided. The ears 48 and 50 can be

reduced such that the fabric of the first and second waistband sections 40 and 42 does not extend above the top securement member 28 or below the bottom securement member 28, but rather the fabric would angle down from the securement members 28 to the intermediate section 44 and angle up to the first and second ends 34 and 36 adjacent to the central sections 46 of the first and second waistband sections 40 and 42 of the garment 22, as represented in Figs. 2, 3, and 5.

In some embodiments, it may be advantageous to leave a small amount of fabric extending above the top securement member 28 and below the bottom securement member 28, and again, angling the fabric down from the securement members 28 to the intermediate section 44 and up to the first and second ends 34 and 36 adjacent to the central sections 46 of the first and second waistband sections 40 and 42 of the garment 22. It would be preferable to have about  $\frac{1}{2}$  inch (about 1.3 cm), more preferably about  $\frac{1}{4}$  inch (about 0.6 cm), of fabric extending above the top securement member 28 and below the bottom securement member 28, and again, angling the fabric down from the securement members 28 to the intermediate section 44 and up to the first and second ends 34 and 36 adjacent to the central sections 46.

Again with reference to Figs. 1 and 2, the absorbent garment 22 includes a substantially liquid impermeable backsheet layer 78, a substantially liquid permeable topsheet layer 80, and an absorbent assembly 82 sandwiched between the backsheet layer 78 and the topsheet layer 80. The backsheet layer 78 and topsheet layer 80 are preferably longer and wider than the absorbent assembly 82, so that the peripheries of the backsheet layer 78 and topsheet layer 80 form margins which may be sealed together using ultrasonic bonds, thermal bonds, adhesives, or other suitable means. The absorbent assembly 82 may be attached to the backsheet layer 78 and/or the topsheet layer 80 using ultrasonic bonds, adhesives, or other suitable means. The garment 22 may also include additional components to assist in the acquisition, distribution and storage of waste material. For example, the garment 22 may include a transport layer, such as described in U.S. Pat. No. 4,798,603 to Meyer et al., which is incorporated herein by reference.

In the illustrated embodiment, the garment 22 is hourglass-shaped with a length in the range of from about 40 to about 110 centimeters, and a width in the range of from about 15 to about 90 centimeters. Of course, the garment 22 may optionally be rectangular, T-shaped, I-shaped, or irregularly-shaped.

The garment 22 may optionally include elastic strands 84 (also commonly referred to as ribbons) longitudinally orientated along each side 38 of the garment and/or along each end 34 and 36 of the garment and attached in a stretched condition to the backsheet layer 78, the topsheet layer 80, or both. The side elastic strands 84 are located in the intermediate section 44 and extend toward or into the first and second waistband sections 40 and 42. The elastic strands 84 along the ends 34 and 36 may be attached as described in U.S. Pat. No. 4,500,316 to Damico, which is incorporated herein by reference. The elastic strands 84 may assist in holding the garment 22 against the body of the user and/or forming seals or gaskets with the body. Suitable elastic materials include a dry-spun coalesced multifilament elastomeric thread sold under the tradename LYCRA and available from I.E. Du Pont de Nemours and Company, a thin ribbon of natural or synthetic rubber, a hot melt elastomeric adhesive, or the like.

The backsheet layer 78 desirably comprises a material that is formed or treated to be liquid impermeable. Alternatively, the backsheet layer 78 may comprise a liquid permeable material and other suitable means, such as a liquid impermeable layer associated with the absorbent assembly 82, can be provided to impede liquid movement away from the absorbent assembly 82. The backsheet layer 78 may comprise a single layer of material or a laminate of two or more separate layers of material. The backsheet layer 78 may also be gas permeable, such that gases encountered during use of the absorbent garment are able to pass through the material under ordinary use conditions, over either all or part of its surface area. Suitable backsheet layer materials include films; wovens; nonwovens; laminates of films, wovens, and/or nonwovens; or the like. The backsheet layer 78 materials may also include stretchable materials. In one particular embodiment, the backsheet layer 78 comprises a liquid impermeable, polyethylene film.

In particular embodiments, the backsheet layer 78 might also include at least one landing member 62 on the outer surface 32 of the backsheet layer 78 in the second waistband section 42. The landing member 62 provides a target attachment zone for receiving the first fastening component 56 of the securement members 28. One suitable landing member is described in U.S. Pat. No. 4,753,649 to Pazdernik, which is incorporated herein by reference. In other embodiments, a portion or region of the outer surface 32 of the backsheet layer 78 may act as a landing member 62 in that the securement members 28 are adapted to engage with the outer surface 32 of the backsheet layer 78.

The absorbent assembly 82 comprises materials adapted to absorb and retain liquid waste. The absorbent assembly 82 may be hourglass-shaped as illustrated, or

rectangular, T-shaped, I-shaped, or irregularly-shaped, and is narrower and desirably also shorter than the backsheet layer 78.

The absorbent assembly 82 may comprise various absorbent materials, such as an air-formed batt of cellulosic fibers (i.e., wood pulp fluff) or a coform material composed of a mixture of cellulosic fibers and synthetic polymer fibers. The absorbent assembly 82 may also include compounds to increase its absorbency, such as 0 - 95 weight percent of organic or inorganic high-absorbency materials, which are typically capable of absorbing at least about 15 and desirably more than 25 times their weight in water. Suitable high-absorbency materials are described in U.S. Pat. Nos. 4,699,823 to Kellenberger et al. and 5,147,343 to Kellenberger, which are incorporated herein by reference. High-absorbency materials are available from various commercial vendors, such as Dow Chemical Company, Hoechst Celanese Corporation, and Allied Colloids, Inc. The absorbent assembly 82 may also include tissue layers or acquisition or distribution layers to help maintain the integrity of fibrous absorbents or transport liquids.

The topsheet layer 80 is formed of a liquid permeable material to allow liquid waste, and possibly semi-solid waste as well, to pass through the topsheet layer 80 and be absorbed by the absorbent assembly 82. The topsheet layer 80 may comprise, for example, a nonwoven web or sheet of wet strength tissue paper, an apertured film, a spunbonded, meltblown or bonded-carded web composed of synthetic polymer filaments or fibers, such as polypropylene, polyethylene, polyesters or the like, or a web of natural polymer filaments or fibers such as rayon or cotton. In addition, the topsheet layer 80 may be treated with a surfactant to aid in liquid transfer.

For the purposes of the present description, the term "nonwoven web" means a web of material which is formed without the aid of a textile weaving or knitting process.

The garment 22 may also include elasticized ears 48 and 50, such as those described in U.S. Pat. No. 4,753,646 to Enloe, the disclosure of which is herein incorporated by reference. The ears 48 and 50 may be composed of a wettable or non-wettable material, as desired. The ear material may be permeable to gas, or permeable to both vapor and liquid.

The foregoing detailed description has been for the purpose of illustration. Thus, a number of modifications and changes may be made without departing from the spirit and scope of the present invention. For instance, alternative or optional features described as part of one embodiment can be used to yield another embodiment. Therefore, the invention should not be limited by the specific embodiments described, but only by the claims.

**CLAIMS**

We claim:

1. An absorbent article having a first end, a first waistband section contiguous with said first end, a second end, a second waistband section contiguous with said second end, an intermediate section which interconnects said first and second waistband sections, and longitudinal sides extending between said first and second ends, said absorbent article comprising:
  - a backsheet layer;
  - a liquid permeable topsheet layer superposed in facing relation with said backsheet layer;
  - an absorbent assembly interposed between said backsheet and topsheet layers;
  - and,
  - a fastening system for providing a side closure for said absorbent article, disposed on said article, said fastening system comprising two independent securement members disposed adjacent each of said longitudinal edges in said first waistband section and having a separation distance of less than 2.5 inches.
2. The absorbent article of Claim 1, wherein at least one said securement member is adapted to engage said backsheet layer of said second waistband section.
3. The absorbent article of Claim 1, wherein at least one said securement member comprises a tab member having a fixed portion joined to said backsheet layer, a tab portion extending outwardly from said longitudinal edge and joined to said fixed portion, and a first fastening component disposed on said tab portion.
4. The absorbent article of Claim 3, wherein at least one said first fastening component comprises an adhesive attachment layer adapted to engage said backsheet layer of said second waistband section.
5. The absorbent article of Claim 3, wherein at least one said first fastening component comprises a first mechanical closure element adapted to mechanically engage said backsheet layer of said second waistband section.

6. The absorbent article of Claim 5, wherein at least one said first mechanical closure element comprises a hook fastening material adapted to mechanically engage said backsheet layer of said second waistband section.
7. The absorbent article of Claim 3, wherein at least one said tab portion further comprises an elastic member disposed between said fixed portion and said first fastening component.
8. An absorbent article having a first end, a first waistband section contiguous with said first end, a second end, a second waistband section contiguous with said second end, an intermediate section which interconnects said first and second waistband sections, and longitudinal sides extending between said first and second ends, said absorbent article comprising:
  - a backsheet layer;
  - a liquid permeable topsheet layer superposed in facing relation with said backsheet layer;
  - an absorbent assembly interposed between said backsheet and topsheet layers; and,
  - a fastening system for providing a side closure for said absorbent article by maintaining said first waistband section and said second waistband section in an overlapping configuration such that lateral tension is maintained around said absorbent article for securing said article on a user, disposed on said absorbent article, said fastening system comprising:
    - (i) two independent securement members disposed adjacent each of said longitudinal edges in said first waistband section and having a separation distance of less than 2.5 inches; and,
    - (ii) at least one landing member disposed on said second waistband section, said landing member being adapted to engage at least one said securement member.
9. The absorbent article of Claim 8, wherein at least one said securement member is adapted to engage said landing member.
10. The absorbent article of Claim 8, wherein at least one said securement member comprises a tab member having a fixed portion joined to said backsheet layer, a tab

portion extending outwardly from said longitudinal edge and joined to said fixed portion, and a first fastening component disposed on said tab portion.

11. The absorbent article of Claim 10, wherein at least one said first fastening component comprises an adhesive attachment layer adapted to engage said landing member.

12. The absorbent article of Claim 10, wherein at least one said first fastening component comprises a first mechanical closure element and said landing member comprises a second fastening component comprising a second mechanical closure element adapted to mechanically engage at least one said first mechanical closure element.

13. The absorbent article of Claim 12, wherein at least one said first mechanical closure element and at least one said second mechanical closure element comprise hook and loop fastening elements.

14. The absorbent article of Claim 10, wherein said tab portion further comprises an elastic member disposed between said fixed portion and said first fastening component.

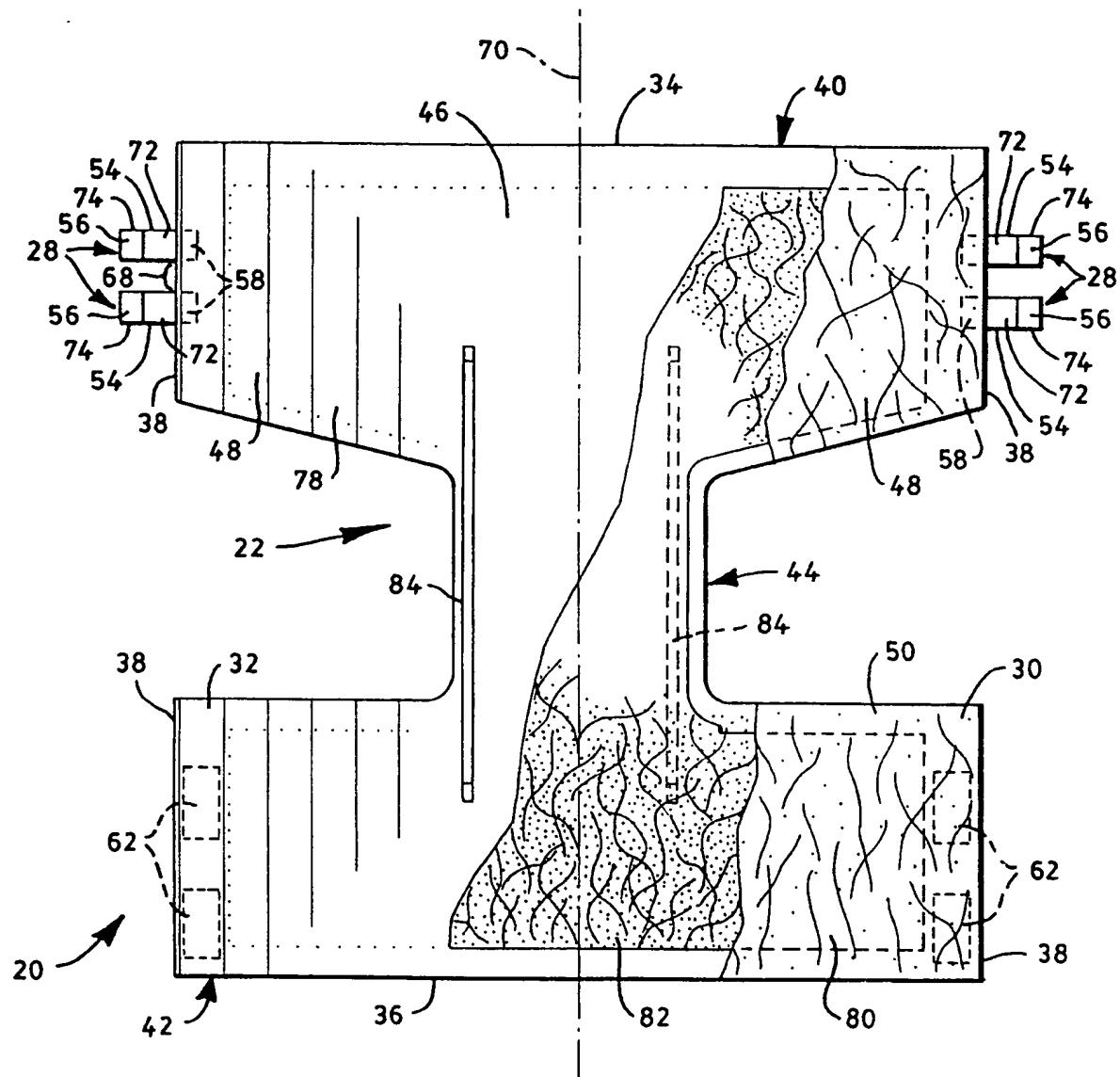
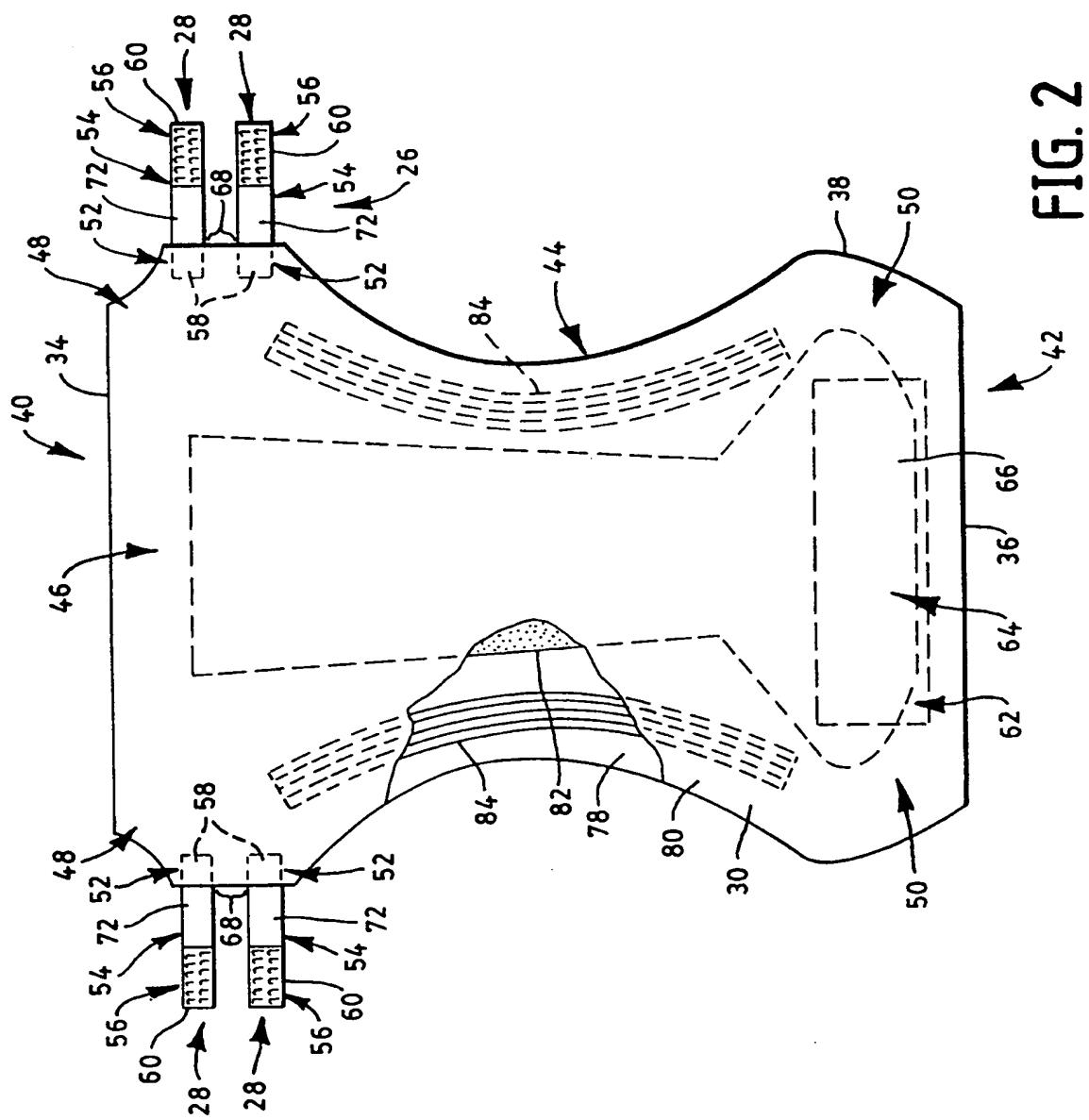


FIG. 1

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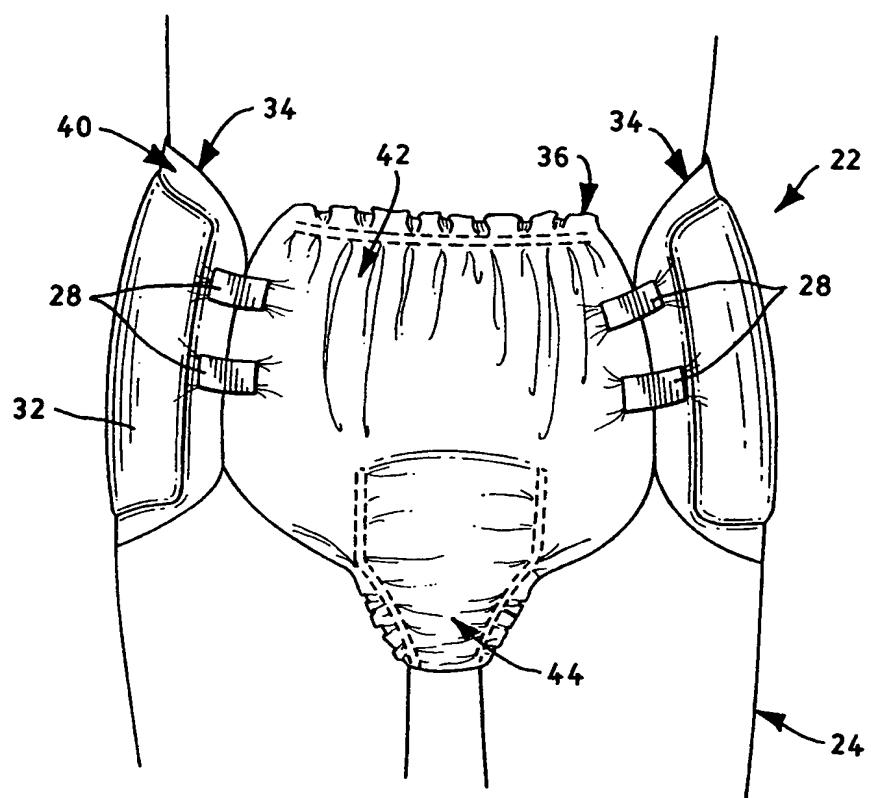


FIG. 3

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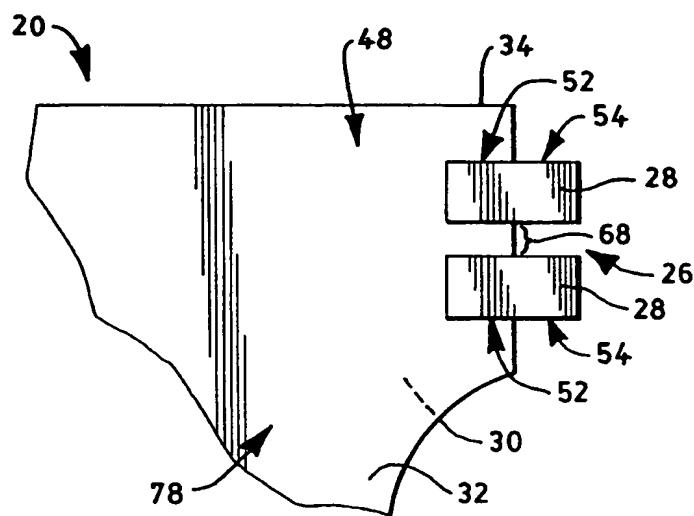


FIG. 4

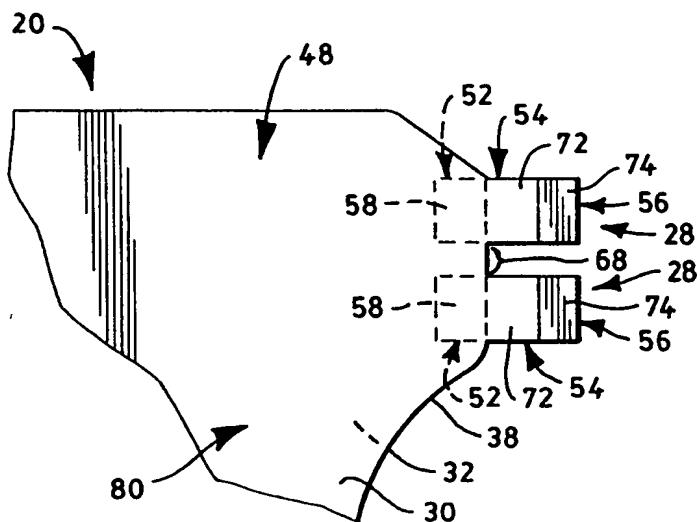


FIG. 5

# INTERNATIONAL SEARCH REPORT

Int. Application No  
PCT/US 98/00622

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 A61F13/56

According to International Patent Classification(IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 244 422 A (KAO CORP) 4 December 1991 see page 13, last paragraph - page 21, paragraph 1; claims; figures ---	1-14
X	WO 96 35402 A (PROCTER & GAMBLE) 14 November 1996 see page 19, line 2 - line 18; claims; figures ---	1-14
A	US 4 826 499 A (AHR NICHOLAS A) 2 May 1989 see claims; figures ---	1,8
A	EP 0 000 969 A (PROCTER & GAMBLE) 7 March 1979 see page 12, line 26 - line 36; claims; figures ---	1,8
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

27 May 1998

04/06/1998

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## INTERNATIONAL SEARCH REPORT

Int. Application No

PCT/US 98/00622

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 4 209 016 A (SCHAAR CHARLES H) 24 June 1980 see claims; figures ---	1,8
A	US 5 531 731 A (BRUSKY CARL J) 2 July 1996 see claims; figures -----	1,8

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Information on patent family members

International Application No

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